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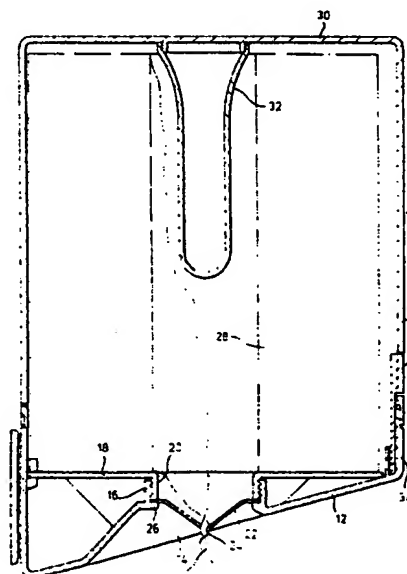
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54 Improvements in sheet material dispensers.

57 A dispenser comprises a housing 10 containing a web of sheet material separable into sheets along spaced lines of weakness. The housing 10 has a resilient element 22 in one wall 12 having an aperture 24 through which the web is dispensed. The aperture 24 is smaller than a rope of the web material and as the web is drawn through the aperture 24 in rope form, it deforms the resilient element 22 to allow it to pass through. The resilient element squeezes the rope with sufficient force that the friction between the rope and the element during extraction of the web is less than the breaking strength of the lines of weakness when the web is in the rope, but greater than the breaking strength of the lines of weakness in the flat web.



IMPROVEMENTS IN SHEET MATERIAL DISPENSERS

5 The present invention relates to dispensers containing, and adapted to dispense sheets from, a continuous web of material, such as tissue, the web having lines of weakness, such as perforations, along which the web is separable into individual sheets.

10 The web may be rolled in the form of a cored roll to be dispensed by unwinding from the outside of the roll, or a coreless roll dispensed from the inside or from the outside, or the web may be in a zig-zag folded pile.

15 The word "tissue" as used herein includes paper, non-woven fabric, woven fabric and laminated fibrous material. The invention is particularly, but not exclusively, concerned with so-called "soft tissue" to be used for facials and personal hygiene. The tissue sheets can also be used as medical, domestic or catering wipes, or as pre-impregnated cloths.

20 The invention is concerned with dispensers of the type generally comprising a housing containing the rolled or folded web, a dispensing aperture being provided in one wall of the housing. In one known type of dispenser of this kind, the dispensing aperture is provided in a rigid wall of the housing  
25 and is shaped so that it has a part which is sufficiently large to allow the web to be pulled substantially

freely therethrough, and a portion which narrows towards the edge of the aperture, so that, by pulling the web obliquely relative to the aperture, the web is caught in the nip of the narrow portion and a  
5 sheet can be pulled to separate it from the web at the perforations. Examples of shapes of such apertures include a star, the centre of which is sufficiently open to allow unrestricted flow therethrough, the nip being provided by one of the points of the star, and  
10 a triangle, one of the apices of the triangle providing the nip.

Disadvantages of known dispensers of this kind include the fact that the user will have to know to pull the web obliquely and in which direction to  
15 pull it to ensure that it is caught in a nip of the aperture. Furthermore, sheets are only separated cleanly from the rest of the web if the user manages to catch the web in the nip at or near a roll of perforations, otherwise the web may tear at a location  
20 other than at the perforations. If the user should catch the web precisely at the perforations, there will be no free end of the web projecting through the aperture for a user to grasp for removal of a subsequent sheet of tissue.

25 In a second known dispenser of this general kind, the aperture in a wall of the dispenser housing

comprises a slot or slots, so that the aperture is substantially closed. The slot may comprise a single straight slit, a pair of crossed slits, a plurality of slits radiating from a central point, or a curved slot, such as an S-shape. The web is pulled out of the housing through the slot which continuously exerts the frictional force on the web to tension it against removal.

Separation of a sheet from the web at a perforated line tends to occur at the slotted aperture, leaving no free end for presentation to a subsequent user. Furthermore, access to the web within the housing is difficult through the slot and initiation of a new web roll or pile is also not easy.

A yet further known type of dispenser attempts to overcome these disadvantages and difficulties by providing a dispensing aperture which comprises an outlet sufficiently large to allow unrestricted flow of the web therethrough and a flap within the housing movable between a position where it allows untensioned flow of the web, to a position where it partially or fully closes off the outlet, so that the tissue web being pulled through the outlet is subjected to tension caused by friction of the web against an edge of the outlet and against the flap. The flap can be opened to give easy access to the outlet to pull the first sheet therethrough.

This dispenser is, however, of relatively complicated and hence expensive construction. Furthermore, in this type of dispenser, the web is bundled into a "rope" during abstraction through the aperture and the effective aperture of this particular dispenser formed between the outlet and flap is rigid and not able to "give" to accommodate localised variations in thickness of the rope. The result of this is that the web may tear at locations other than the perforations.

It is an object of the present invention to overcome or minimise the above disadvantages and difficulties by providing a dispenser from which sheets may be dispensed, one at a time, from a continuous perforated web of tissue material, the free end of the remaining web being left to project from the dispenser after each dispensing action.

According to the invention there is provided a dispenser containing, and adapted to dispense sheets from, a continuous web of material separable into sheets along spaced apart lines of weakness, the dispenser comprising a housing containing the web and, in a wall of the housing, a resilient element having an aperture therein through which the sheets can be dispensed, the element being adapted to form the web laterally into a rope as it passes through the aperture

and being adapted to squeeze the rope with sufficient force that the friction between the rope and element, during extraction of the rope through the aperture, is less than the breaking strength of the lines of weakness when the web is in the rope, but greater than the breaking strength of the lines of weakness in the flat web.

Preferably, the aperture in the resilient element is of generally circular contour. This aids formation of the rope.

In a preferred embodiment, the resilient element comprises a rubber membrane. The aperture in this rubber membrane may be either circular or oval.

Alternatively, the resilient element comprises a sheet of semi-rigid plastics material, the aperture being generally circular. The aperture in such an element may be either of toothed contour, crenulated contour, or it may comprise a central circular opening with a plurality of slits radiating therefrom.

In a further alternative embodiment, the resilient element comprises an open-ended truncated cone, the smaller open end of the cone being of expandable diameter.

Embodiments of the invention will now be described, by way of example only, and with reference to the accompanying drawings in which:

Figure 1 is a longitudinal section through a dispenser in accordance with the invention;

Figure 2 is a longitudinal cross-section of the dispenser shown in Figure 1, but illustrating the dispensing action;

Figure 3 is a partial view of the diaphragm of the dispenser of Figure 1, viewed in the direction of arrows III in Figure 1, on an enlarged scale;

Figures 4, 5, 6 and 7 each show alternative embodiments of resilient element, in a view similar to that of Figure 3; and

Figure 8 illustrates a yet further embodiment of resilient element.

Referring to Figures 1 - 3 of the drawings, there is shown a dispenser which generally comprises a housing 10 of generally cylindrical form, having a lower wall 12 extending in a plane which is oblique to the longitudinal axis of the housing 10. Centrally disposed in the lower wall 12 of the housing is a recess 14. A threaded collar 16, moulded integrally with the lower wall 12 of the housing, projects inwardly of the dispenser adjacent the recess 14.

An annular platform 18, having a threaded ring 20 depending centrally therefrom, is threadingly engaged, by means of its ring 20, on the threaded collar 16 of the housing.

Mounted in the lower wall 12 of the housing is

a resilient element 22, comprising a rubber membrane, or diaphragm, having a central aperture 24. The diaphragm 22 is mounted by seating its edge region against a circular lip 26 which is integral with the lower wall 12 of the housing. The diaphragm is held in place against the lip 26 by the circular free edge of the ring 20. Thus, to insert the diaphragm in the first place, or to renew it, the platform 18 is unscrewed from the collar 16, a diaphragm is dropped into place on the lip 26 and the platform 18 screwed back onto the collar 16. A supply of web material, for instance a coreless roll 28 is contained within the housing 10 and rests on the platform 18. Depending from the upper wall 30 of the housing is a spigot 32 which acts as a support for the roll, maintaining it in position, particularly when a considerable proportion of the roll has been dispensed from the centre of the roll 28 with the danger of the roll collapsing, thus fouling extraction from the dispenser.

The dispenser 10 is in two parts, a lower part 34 interconnected with an upper part 36. The two parts may be lockable as security against theft of the roll 28 from the housing 10. An inspection window 38 of clear material is provided in the wall of the upper part 36 of the container, to show whether there is any web material loaded into the housing 10. The housing 10 may include a mounting bracket (not shown) for



mounting the housing 10 on a wall.

In use of the dispenser, a roll 28 is first loaded into the container by separating the two parts 34, 36 of the housing and placing a roll 28, on its end, to rest on the platform 18. While the upper part of the part 36 of the housing is still separated from the lower part 34, the free end of the roll 28 is unwound from its core and manually forced through the aperture 24 in the diaphragm 22. The upper part 36 is then secured to the lower part 34 of the housing and dispensing may commence. Initiation of the roll is also possible, even if the container is closed, as it is possible to stretch open the aperture 24 in the rubber diaphragm 22 to reach into the housing and thread the free end of the roll through the aperture.

The free end of the web projecting through the aperture 24 is then pulled downwardly, distorting the diaphragm 22 into a shape approximately as shown in Figure 2. The aperture 24 in the rubber diaphragm 22 is able to expand sufficiently to allow a rope of the web to be formed and pulled through the aperture 24. During extraction of the rope through the aperture, there is no attempt made to initiate tearing at the lines of weakness, such as perforations, on the web. The aperture is intended to be as smooth as possible to avoid premature tearing which would lead to torn

5 sheets and a poor dispensing action. While the web is gathered into a rope-like form, each line of perforations is approximately in the form of a spiral and the load required to pull the web through the aperture is prevented from being applied to a discrete portion of the perforated line.

10 Once the rope-like web has passed through the aperture, the natural resilience of the tissue material causes the web to open out, resulting in a reduction of the friction between the various folds and allowing the load to be taken over the full width of the web. Once the rope is opened out to the point where the load is transferred substantially to the lines of weakness, the web will break virtually instantaneously.

15 It is to be noted that this rupture occurs at some distance from the diaphragm and not at the aperture, with the result that a free end of web remains projecting through the diaphragm, ready for the next user.

20 Once a sheet has been torn off in this way, this incident being shown in Figure 2, the natural resilience of the diaphragm 22 will return it to its approximately flat position in Figure 1, although the free end of web will remain projecting through the aperture.

25 The choice of diaphragm material is important and a balance should be reached between a rubber

that is too soft, leading to excess wear at the aperture during the life of the dispenser, and one that is too hard and without sufficient resilience to exert the necessary squeezing force on the

5 rope to initiate a clean tearing action. Examples of suitable materials are natural rubber or a synthetic rubber such as neoprene, formed from sheets of between 0.5 and 2 mm thick depending on the web material being dispensed. In the illustrated embodiment, the

10 diaphragm 22 is mounted in such a way that replacement of the diaphragm would be possible, although if the diaphragm material is chosen suitably, it is not necessary for the diaphragm 22 to be replaceable and hence for the platform 18 to be removable from the

15 housing 10. Exchangeability of the diaphragm enables the dispenser to be readily adapted by the manufacturer to suit different types of web material.

Figures 4 to 8 illustrate alternative embodiments of resilient element.

20 In Figure 4, there is shown a rubber diaphragm having at its centre an oval, rather than a spherical aperture 24. Figures 5 to 7 illustrate a resilient element made of a semi-rigid plastics material. In Figure 5, the aperture 24 is circular and has a serrated

25 or tooth-like contour. The combination of the type of material and this shape of edge provides the resilience required to squeeze the rope as it is dispensed.

The aperture shown in Figure 6 comprises a central opening 40, having slits 42 radiating therefrom.

Figure 7 is similar to the embodiment of Figure 5, and instead of a tooth-like edge, the aperture 24 has a crenulated, or rounded tooth-like edge.

The resilient element 22 shown in Figure 8 comprises a truncated cone 44, the lower end 46 of which is expandable by virtue of the surface of the cone having overlapping free edges 48.

CLAIMS.

1. A dispenser containing, and adapted to dispense sheets from, a continuous web of material separable into sheets along spaced apart lines of weakness, the dispenser comprising a housing 10  
5 containing the web and, in a wall 12 of the housing, a resilient element 22 having an aperture 24 therein through which the sheets can be dispensed, characterised in that the resilient element 22 is adapted to form the web laterally into a rope as it passes through the  
10 aperture 24, and to squeeze the rope with sufficient force that the friction between the rope and the element, during extraction of the rope through the aperture, is less than the breaking strength of the lines of weakness when the web is in the rope, but greater than  
15 the breaking strength of the lines of weakness in the flat web.

2. A dispenser as claimed in Claim 1, characterised in that the aperture 24 is of generally circular contour.

3. A dispenser as claimed in Claim 1 or Claim 2,  
20 characterised in that the resilient element 22 comprises a rubber or rubber-like membrane.

4. A dispenser as claimed in Claim 3, characterised in that the web of material is a soft tissue paper web and the membrane is operable to deform in the downstream  
25 direction of the web as the web is dispensed through the aperture.

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5. A dispenser as claimed in Claim 3 or Claim 4, characterised in that the aperture in the membrane 22 is either circular or oval.

6. A dispenser as claimed in Claim 1,  
5 characterised in that the resilient element 22 comprises a sheet of semi-rigid plastics material, and the aperture 24 therein is of generally circular contour.

7. A dispenser as claimed in Claim 6,  
characterised in that the edges of said aperture 24 are  
10 toothed, crenulated or have a plurality of slits 42 radiating therefrom.

8. A dispenser as claimed in Claim 1,  
characterised in that the resilient element 22 comprises  
an open-ended truncated cone 44, the smaller open end  
15 46 being of expandable diameter.

9. A dispenser as claimed in any one of the preceding claims, characterised in that said resilient element 22 is replaceably mounted in said housing wall 12.

20 10. A dispenser as claimed in any of the preceding claims, characterised in that the web is stored in the housing 10 as a coreless roll 28 and is dispensed from the inner aspect thereof, and a spigot 32 is provided within the housing 10 operable to support the roll 28  
25 therein.

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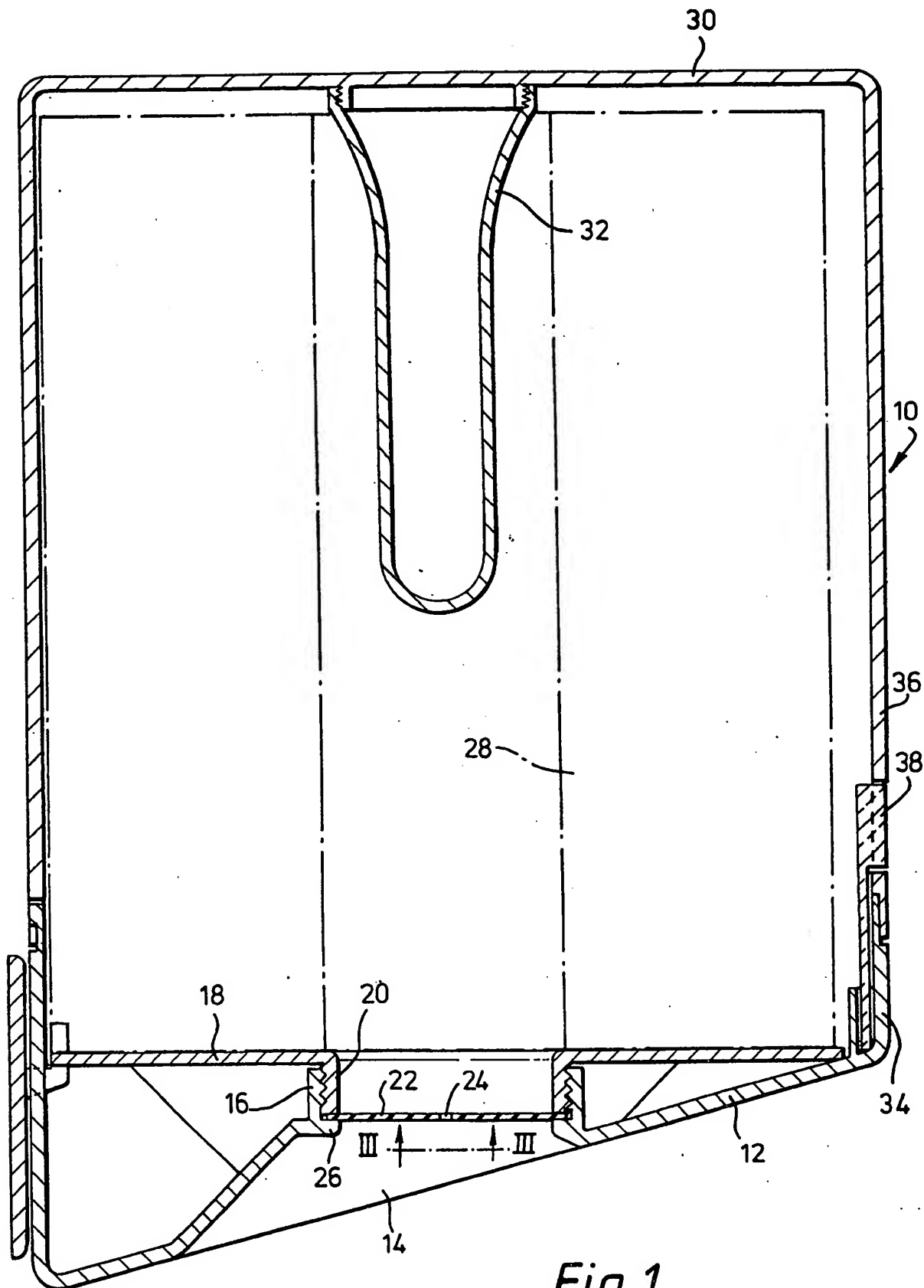


Fig. 1.

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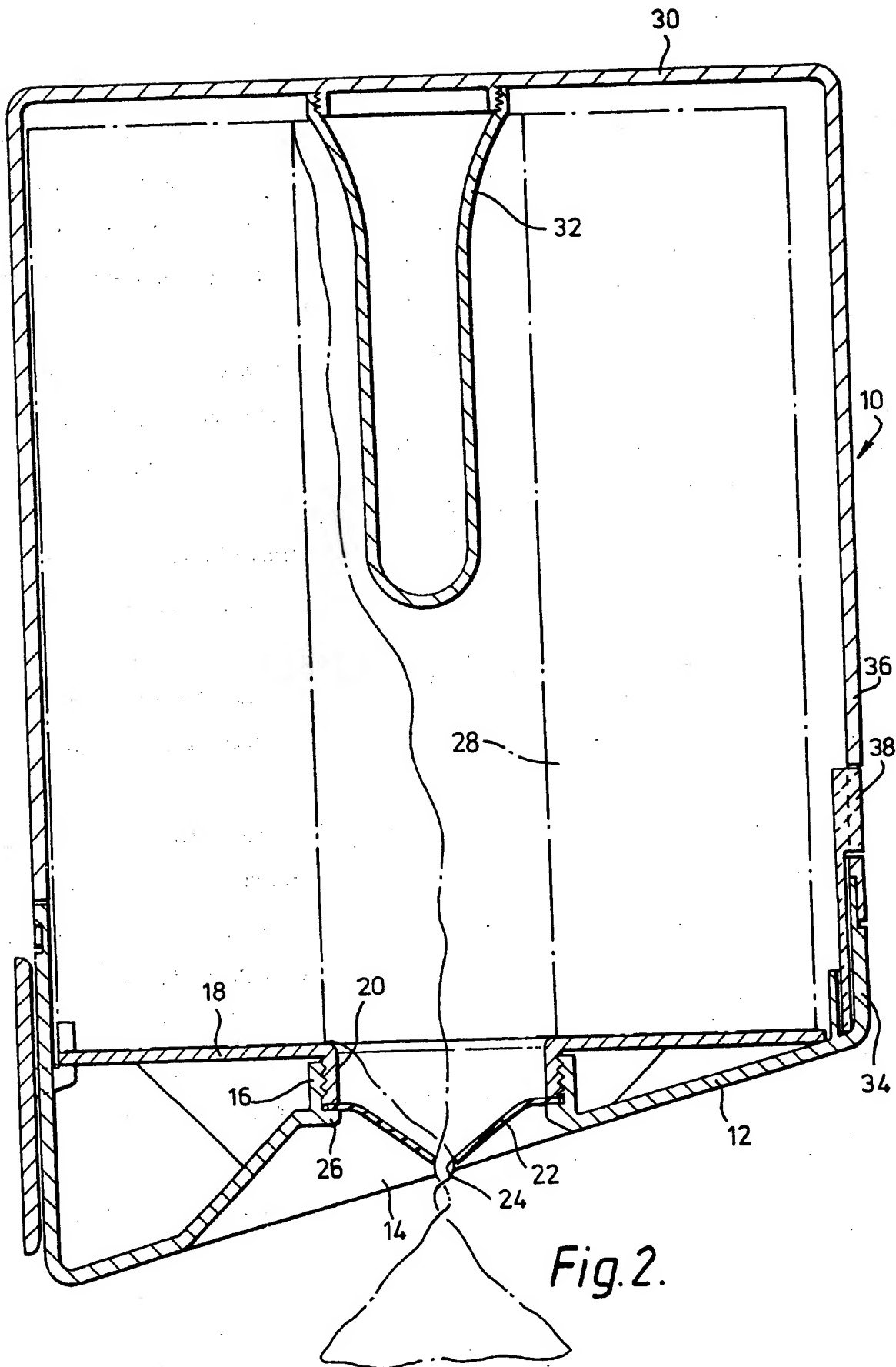


Fig. 2.



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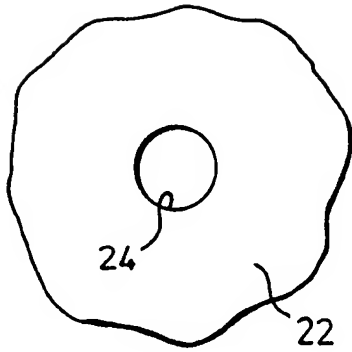


Fig. 3.

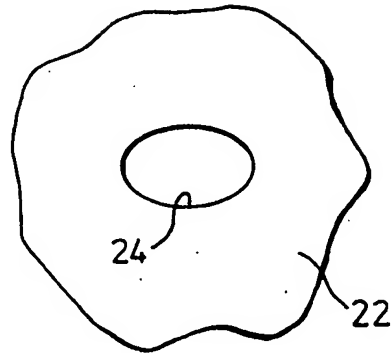


Fig. 4.

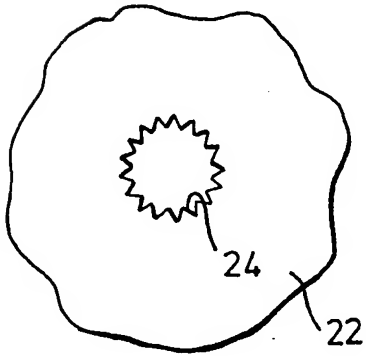


Fig. 5.

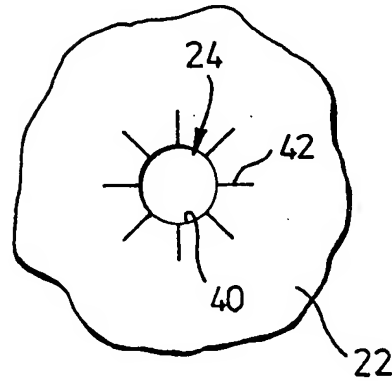


Fig. 6.

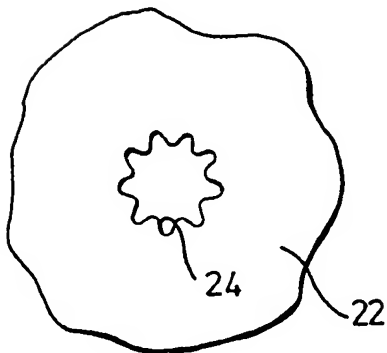


Fig. 7.

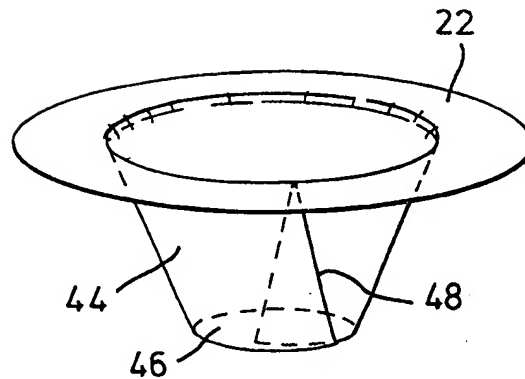


Fig. 8.



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# EUROPEAN SEARCH REPORT

0107487

Application number

EP 83 30 6386

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
X	FR-A-2 399 825 (WAKODO) * Page 2, lines 32-36; page 3, lines 1-36; page 4, lines 1-36; page 5, lines 1-5; figures 1-8 *	1-6,9	A 47 K 10/38
A	--- AU-B- 527 032 (DOYLE) * Page 4, lines 5-37; page 5, lines 1-36; figures 1-5 *	1,4	
A	--- DE-A-2 818 757 (DAIMLER) * Page 2, lines 12-19; page 3, lines 1-28; page 4, lines 1-3; figures *	1,3,4	
A	--- US-A-2 004 614 (MEAGHER) * Page 1, column 2, lines 14-24; figures 1,2 *	1,2,5,7	TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
A	--- DE-A-2 243 761 (LARSSON) * Page 2, lines 27-34; page 3, lines 1-34; page 4, lines 1-9; figures 1,2 *	7,8,10	A 47 K
A	--- DE-A-2 222 357 (LARSSON) * Page 2, lines 30-32; page 3, lines 1-19; figures 1-4 *	7,8	
A	--- AU-B- 520 623 (UNILEVER) * Page 4, lines 15-24; figure 1 *	5	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20-01-1984	Examiner SCHOLS W.L.H.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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